What is claimed is:

1. A method for laser cooling of atoms for laser-cooling atoms each involving a plurality of magnetic subsidiary levels as its cooling lower level being in a ground state in energy level, comprising:

emitting sequentially each coherent light of a predetermined wavelength containing a plurality of different polarized light to the atoms in response to the plurality of magnetic subsidiary levels being the cooling lower level in the ground state in an atom, which is an object to be laser-cooled, while keeping a predetermined time interval.

2. A method for laser cooling of atoms as claimed in claim 1 wherein said predetermined time interval is that substantially twice longer than spontaneous emission lifetime of the atom corresponding to a time required for absorption - emission of one photon.

3. An apparatus for laser cooling of atoms for laser-cooling atoms each involving a plurality of magnetic subsidiary levels as its cooling lower level being in a ground state in energy level, comprising:

a coherent light source for producing a coherent light having a predetermined wavelength;

a polarized light control means for controlling polarized light of the coherent light output from said coherent light source to emit the coherent light of different polarized light to the atom with a predetermined time interval; and

the polarized light of the coherent light emitted from said polarized light control means corresponds respectively to the

plurality of different polarized light in response to the plurality of magnetic subsidiary levels being the cooling lower level in the ground state of an atom, which is an object to be laser-cooled.

4. An apparatus for laser cooling of atoms for laser-cooling atoms each involving a plurality of magnetic subsidiary levels as its cooling lower level being in a ground state in energy level, comprising:

a plurality of coherent light sources outputting respectively a coherent light of a predetermined wavelength involving respectively a plurality of different polarized light in response to the plurality of magnetic subsidiary levels being the cooling level in the ground state of an atom, which is an object to be cooled;

each coherent light of the predetermined wavelength containing the plurality of different polarized light output from said plurality of coherent light sources being sequentially emitted to the atom while keeping a predetermined time interval; and

the polarized light of the coherent light emitted from said plurality of coherent light sources corresponding respectively to the plurality of different polarized light in response to the plurality of magnetic subsidiary levels being the cooling lower level in the ground state of the atom, which is the object to be laser-cooled.

5. An apparatus for laser cooling of atoms as claimed in claim 4 wherein:

at least one of said plurality of coherent light sources

is that outputs selectively coherent light involving two different polarized light.

6. An apparatus for laser cooling of atoms as claimed in claim 3 wherein:

said predetermined time interval is that substantially twice longer than spontaneous emission lifetime of the atom corresponding to a time required for absorption - emission of one photon.

7. An apparatus for laser cooling of atoms as claimed in claim 4 wherein:

said predetermined time interval is that substantially twice longer than spontaneous emission lifetime of the atom corresponding to a time required for absorption - emission of one photon.

8. An apparatus for laser cooling of atoms as claimed in claim 5 wherein:

said predetermined time interval is that substantially twice longer than spontaneous emission lifetime of the atom corresponding to a time required for absorption - emission of one photon.

9. A coherent light source used for laser cooling of atoms, comprising:

a mode-locked (lock) picosecond laser for outputting coherent light of a predetermined wavelength;

a wavelength conversion element for converting a wavelength of the coherent light of the predetermined wavelength output from said mode-locked (lock) picosecond laser;

a wavelength dispersion element for selecting coherent light

of a desired wavelength from the coherent light, which has been subjected to wavelength conversion by means of said wavelength conversion element, to output said coherent light selected; and

a feedback circuit for measuring a wavelength of the coherent light output from said wavelength dispersion element to output a signal to said mode-locked (lock) picosecond laser in such that said mode-locked (lock) picosecond laser outputs coherent light of a predetermined wavelength on the basis of the measured result.

10. An apparatus for laser cooling of atoms for laser-cooling atoms each involving a plurality of magnetic subsidiary levels as its cooling lower level being in a ground state in energy level, comprising:

a coherent light source producing coherent light of predetermined wavelength;

a polarized light control means including a half-wavelength plate and an acousto-optic device, and controlling polarized light obtained from the coherent light output from said coherent light source by means of said half-wavelength plate to emit coherent light involving different polarized light to the atoms with a predetermined time interval; and

chirped cooling being effected by changing time-varyingly a frequency by the use of said acousto-optic device to decelerate the atoms as well as to separate time-varyingly the polarized light obtained by means of said half-wavelength plate with the use of said acousto-optic device, besides to optimize the frequency thereby cooling the atoms by means of scattering force.

11. A coherent light source used for laser cooling of atoms, comprising:

a first laser beam producing system for producing laser beam of a first wavelength; and

a second laser beam producing system for producing laser beam of a second wavelength as well as for introducing said laser beam of the first wavelength produced in said first laser beam producing system thereinto to produce laser beam of a third wavelength as a result of sum frequency mixing of the laser beam of said first wavelength and the laser beam of said second wavelength.

12. An apparatus for laser cooling of atoms for laser-cooling atoms each involving a plurality of magnetic subsidiary levels as its cooling lower level being in a ground state in energy level, comprising:

a coherent light source including a first laser beam producing system for producing laser beam of a first wavelength, and a second laser beam producing system for producing laser beam of a second wavelength as well as for introducing said laser beam of the first wavelength produced in said first laser beam producing system thereinto to produce laser beam of a third wavelength as a result of sum frequency mixing of the laser beam of said first wavelength and the laser beam of said second wavelength;

a polarized light control means including a half-wavelength plate and an acousto-optic device, and controlling polarized light obtained from the coherent light output from said coherent light source by means of said half-wavelength plate to emit coherent light involving different polarized light to the atoms with a predetermined time interval; and

chirped cooling being effected by changing time-varyingly

a frequency by the use of said acousto-optic device to decelerate the atoms as well as to separate time-varyingly the polarized light obtained by means of said half-wavelength plate with the use of said acousto-optic device, besides to optimize the frequency thereby cooling the atoms by means of scattering force.